

# The Role of Fatwas and Public Policy in Adopting Blockchain Technology in the Halal Industry in Indonesia

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## ABSTRACT

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The Indonesian halal industry faces complex challenges in maintaining integrity and consumer trust, particularly in the supply chain, which poses a serious threat. This article aims to analyze the role of fatwas and Sharia laws and regulations in accommodating and regulating the implementation of blockchain technology as a solution to create transparency in the halal supply chain. This study uses a qualitative method with a library research approach, analyzing various primary and secondary sources, including fatwas, regulations, and academic literature on blockchain and the halal industry. The research findings indicate that while blockchain technology offers decentralization, transparency, and immutability in line with Sharia principles, its implementation raises new legal questions, such as the legal status of smart contracts and digital data as evidence. Therefore, the existence of fatwas from authorities such as Dewan Syariah Nasional (DSN) and Majelis Ulama Indonesia (MUI), as well as strong government regulations, is urgent. Fatwas are needed to provide Sharia legitimacy and operational guidance, while government regulations create legal certainty and a standardization framework. The synergy between sharia fatwas, positive legal regulations, and blockchain technology is believed to be able to build a more transparent, accountable, and globally competitive Indonesian halal industry ecosystem



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## INTRODUCTION

The halal industry is increasingly developing into a significant global economic force, encompassing not only the food sector but also finance, cosmetics, pharmaceuticals, tourism, and fashion. Countries with predominantly Muslim populations, including Indonesia, possess substantial potential for halal industry development. According to the *State of the Global Islamic Economy Report 2024/2025*, Indonesia ranks third globally in Islamic economic indicators, reflecting its strategic position in the global halal market. This position has attracted many foreign companies to target Indonesia as a key halal market (Almunawar et al., 2025). However, this economic potential is accompanied by complex challenges, particularly in ensuring integrity and transparency throughout the halal supply chain.

Various cases of misuse, such as unauthorized halal labeling, unclear origins of raw materials, and certificate forgery, have undermined consumer trust and damaged the reputation of the halal industry (Alourani & Khan, 2025). These issues negatively affect consumer confidence and purchasing behavior. Moreover, they unfairly impact businesses that have complied with halal certification requirements. Such conditions highlight the importance of strict supervision and law enforcement to protect consumers from misleading practices. Effective regulatory oversight is therefore essential to maintain trust and credibility within the halal market (Usmi et al., 2024).

To address integrity challenges in the halal supply chain, the role of the Sharia legal framework is fundamental. Fatwas issued by religious authorities, such as the Majelis Ulama Indonesia (MUI), serve as essential legal references guiding halal standards, including technological and governance aspects of the supply chain. However, the effectiveness of fatwas must be strengthened through clear, adequate, and enforceable legal regulations. These regulations are needed to provide legal certainty and ensure consistent implementation of halal assurance systems. Institutional synergy involving stakeholders such as the Badan Penyelenggara Jaminan Produk Halal (BPJPH) is also critical.

Transparency and traceability are key pillars in building consumer trust in halal products. Muslim consumers have the right to clear and accurate information regarding the halal status of the products they consume. Nevertheless, many consumers still face difficulties in accessing reliable halal-related information (Fernando & Hassan, 2025). One strategic effort to overcome this challenge is the adoption of technological innovations. Blockchain technology has emerged as a promising tool to enhance supply chain transparency and collaboration among stakeholders (Apriani et al., 2023).

Blockchain technology offers a decentralized, transparent, and immutable system capable of recording every transaction within the supply chain. Each stage of production and distribution can be permanently documented and accessed by both authorities and



consumers (Nugroho et al., 2024). Despite these advantages, the adoption of blockchain technology within a Sharia framework raises legal and religious concerns. Indonesia currently lacks explicit fatwas or Sharia regulations addressing the use of blockchain for halal supply chain transparency. The use of smart contracts, in particular, raises important questions from an Islamic legal perspective.

Previous studies indicate that blockchain integration into the Halal Assurance System (HAS) can facilitate documentation and traceability of halal production processes (Qanita et al., 2024). Selvanesan and Rodrigo (2024) further explain that several countries in Europe, Australia, and North America have successfully implemented innovation-friendly regulations supporting blockchain adoption. Additionally, Salehi and Molavi (2025) argue that blockchain enhances corporate accountability by providing transparent and verifiable transaction records. These findings highlight blockchain's potential contribution to strengthening halal governance. However, its implementation must remain aligned with Sharia principles.

This study therefore focuses on two critical elements for effective blockchain adoption within Indonesia's halal industry. The first concerns the legal status of blockchain technology in relation to Islamic contract concepts (*akad*). The second relates to ensuring data integrity and preventing misuse of transaction information by irresponsible parties. Both elements require clear guidance from fatwas and Sharia-based regulations. Addressing these issues is essential to ensure that technological innovation does not contradict Islamic legal principles.

The concept of halal fundamentally refers to permissibility according to Islamic law, while haram refers to prohibition (Wahyudi & Karim, 2022). Halal is associated with goodness, benefit, and blessing, whereas haram is linked to harm and impurity that must be avoided by Muslims (Sholihin, 2024). In Islamic teachings, the assessment of halal and haram is not limited to the final product but includes its origin and production process. This principle applies comprehensively across the supply chain, including raw materials, storage, transportation, processing, and distribution. This understanding aligns with Qur'anic guidance in Q.S. Al-Baqarah:168, which emphasizes consumption of what is both halal and *thayyib*.

In Indonesia's industrial context, halal is no longer merely a legal obligation but has become a critical branding element shaping consumer perception. Halal labeling signals compliance with standards established by authorities such as BPJPH and assures product safety, particularly for Muslim consumers. Halal certification provides reassurance not only for consumers but also for businesses by enhancing market credibility (Warto & Samsuri, 2020). As a result, halal branding has become a strategic



asset within competitive markets. Trust in halal labels directly influences purchasing decisions.

Halal supply chain management refers to the integrated management of goods, information, and capital from raw materials to end consumers while adhering to halal and *thayyib* values (Chatra et al., 2023; Ardiantono et al., 2024). Transparency within the supply chain significantly enhances consumer trust. A major challenge lies in ensuring strict separation from non-halal materials to avoid contamination. Halal labeling therefore represents not only religious compliance but also quality and safety assurance. Trust in certification institutions plays a vital role in strengthening confidence in halal products (Dermawan et al., 2024).

In Islamic jurisprudence, a fatwa is a non-binding legal opinion issued by a qualified scholar in response to specific questions (Adam, 2022). In Indonesia, MUI fatwas function as the primary religious reference in halal certification. Through Law No. 33 of 2014 on Halal Product Assurance, MUI fatwas are integrated into the national legal system via mandatory halal recommendations prior to BPJPH certification. This integration reflects the contribution of Islamic law to national legislation, particularly in promoting justice, morality, and public welfare (Wicaksono & Mahipal, 2025).

Sharia-based legal regulations extend beyond the Halal Product Assurance Law to include government regulations and BPJPH technical guidelines. These regulations establish standards, ensure compliance, and impose sanctions on violations. The Indonesian government has issued Government Regulation No. 39 of 2021 to provide detailed implementation guidance. Sanctions for non-compliance range from written warnings and fines to certificate revocation and product recalls (Yaumidin et al., 2025). These measures reinforce the authority of halal governance.

Blockchain technology, first introduced by Satoshi Nakamoto in 2008, operates as a decentralized and distributed ledger system (Yli-Huumo et al., 2016). It represents an architectural shift toward shared and programmable value rather than a complete system replacement (Nuruly et al., 2025). Studies show that blockchain enhances transparency and traceability in supply chains (Zhang, 2025). In the halal context, halal awareness combined with blockchain technology positively influences the Halal Value Chain (Effendi et al., 2023). However, research on blockchain adoption in Indonesia's halal industry remains limited, particularly regarding Sharia and legal perspectives. This study seeks to fill that gap by analyzing the role of fatwas and regulations in facilitating blockchain adoption within the halal industr.

## RESEARCH METHODE



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This study employed a qualitative research design using a library research approach. The purpose of this approach was to review, analyze, and compare relevant scholarly articles, the findings of which are presented in this study. Specifically, the study aims to examine and compare existing literature concerning the urgency of fatwas and Sharia law in the implementation of blockchain technology within the halal industry in Indonesia. The research utilized secondary data obtained from academic articles and peer-reviewed journals addressing related topics, including blockchain systems, halal supply chain management, and Sharia economic law. In addition, the study analyzed relevant legal frameworks, such as Law No. 33 of 2014 on Halal Product Assurance and its implementing regulations, as well as fatwas issued by the National Sharia Council of the Indonesian Ulama Council (DSN–MUI). These fatwas are particularly relevant to issues of halal certification and Islamic commercial (*muamalah*) principles.

## RESULT AND DISCUSSION

This chapter presents an in-depth discussion of the urgency of fatwas and Sharia law in supporting the transparency of blockchain technology within the Indonesian halal industry. Transparency is a core principle in halal assurance because it directly influences consumer trust and religious compliance (Alourani & Khan, 2025: 118). As the halal industry expands rapidly, supply chains become more complex and difficult to monitor. This complexity increases the risk of non-compliance with halal standards. Therefore, strengthening transparency mechanisms has become a critical necessity.

The halal supply chain involves multiple interconnected actors, including raw material suppliers, slaughterhouses, processors, logistics providers, and retailers. Each actor may use different systems for recording and reporting information. This fragmentation creates weak coordination and inconsistent data flows across the supply chain (Chatra et al., 2023: 41). In many cases, halal assurance relies on centralized systems and physical documentation. Such systems are prone to inefficiencies, delays, and manipulation.

Traditional record-keeping systems often fail to provide real-time visibility into supply chain activities. Physical documents can be lost, altered, or falsified, intentionally or unintentionally. These weaknesses increase the likelihood of misinformation regarding halal ingredients or production processes (Dermawan et al., 2024: 77). As a result, halal certification may no longer fully reflect actual production conditions. This situation undermines the credibility of halal assurance institutions.

Information asymmetry is a significant issue in halal supply chains. Producers typically have greater access to information than consumers regarding sourcing, processing, and handling practices. Consumers, however, rely heavily on labels and certifications. When information is incomplete or misleading, consumer trust deteriorates



(Fernando & Hassan, 2025: 92). From an Islamic perspective, such asymmetry contradicts ethical business conduct.

Sharia principles emphasize honesty (*shidiq*), transparency (*bayyinah*), and fairness in all economic transactions. Islam strictly prohibits *gharar*, which refers to uncertainty or ambiguity that may lead to injustice (Sholihin, 2024: 56). In the halal context, unclear information about ingredients or processes constitutes a form of *gharar*. Therefore, improving transparency is not only a managerial concern but also a religious obligation. Halal assurance must ensure clarity throughout the supply chain. Blockchain technology offers a promising solution to these transparency challenges. As a decentralized ledger system, blockchain records transactions across a distributed network rather than a single authority. Each transaction is stored in a block that is cryptographically linked to previous blocks (Yli-Huumo et al., 2016: 5). This structure makes data tampering extremely difficult. Consequently, blockchain enhances data integrity and trust.

One of blockchain's key features is immutability. Once data are recorded and validated by the network, they cannot be changed without consensus. This characteristic significantly reduces opportunities for fraud and manipulation (Zhang, 2025: 210). In halal supply chains, immutability ensures that halal-related records remain accurate and verifiable. It also strengthens accountability among supply chain actors. Thus, blockchain aligns well with Sharia values of trust and responsibility. Another important advantage of blockchain is traceability. Blockchain enables the tracking of raw materials from their origin through processing and distribution stages. Each movement of goods is recorded and time-stamped within the system (Effendi et al., 2023: 134). This allows auditors to verify compliance efficiently. Consumers can also access verified information about product origins.

Traceability enhances the effectiveness of halal audits. Halal certification bodies can quickly identify non-compliant practices within the supply chain. This reduces audit costs and improves enforcement efficiency. It also discourages unethical behavior among producers and distributors. Ultimately, traceability strengthens the credibility of halal certification systems. Blockchain also enables controlled transparency. Sensitive information, such as proprietary business data, can be restricted to authorized parties. Access permissions can be designed to protect confidentiality while ensuring accountability (Nugroho et al., 2024: 89). This balance is crucial for encouraging industry adoption. Transparency must not compromise commercial interests.

Efficiency is another benefit offered by blockchain through smart contracts. Smart contracts are self-executing digital agreements that operate based on predefined conditions. In halal supply chains, smart contracts can automate payments once halal verification is completed (Apriani et al., 2023: 58). This reduces transaction costs and



delays. Automation also minimizes human error. Despite these advantages, blockchain implementation raises important Sharia concerns. Technology adoption must be assessed within Islamic legal frameworks. Certain blockchain features, particularly smart contracts, require religious clarification. Without such clarification, uncertainty regarding Sharia compliance may persist (Adam, 2022: 103). This uncertainty can hinder adoption among halal businesses.

Fatwas issued by the DSN-MUI play a crucial role in addressing these concerns. Fatwas provide authoritative guidance on whether smart contracts can be recognized as valid Sharia contracts (*akad*). Recognition depends on fulfilling essential contractual pillars such as consent, lawful objects, and competent parties (DSN-MUI Fatwa No. 110/2017: 4). Clear fatwas reduce legal ambiguity. They also increase industry confidence in technology adoption. Fatwas are also needed to clarify *gharar* in digital transactions. Smart contract code may introduce uncertainty if conditions are poorly defined. Fatwas can establish acceptable thresholds of uncertainty within programmable contracts (Wahyudi & Karim, 2022: 67). This guidance ensures Sharia compliance in digital environments. It also promotes safer innovation.

Moreover, fatwas must emphasize that blockchain does not replace physical halal compliance. Technology serves as a verification and documentation tool rather than a substitute for halal inspection. Halal integrity still depends on proper slaughtering, processing, and handling practices (Qanita et al., 2024: 121). Blockchain only strengthens monitoring mechanisms. This distinction is essential to avoid misuse of technology. In addition to fatwas, government regulation is equally important. Legal certainty encourages broader adoption of blockchain systems. Regulations issued by BPJPH and related ministries must recognize blockchain records as legally valid evidence (Usmi et al., 2024: 39). This recognition is essential for audits and dispute resolution. Without legal backing, blockchain remains underutilized.

Interoperability standards are another regulatory necessity. Blockchain platforms must be compatible with BPJPH and LPH systems. Standardization ensures seamless data exchange across institutions (Selvanesan & Rodrigo, 2024: 188). Without interoperability, technological fragmentation may occur. Clear standards support system integration. Data protection is also a critical regulatory concern. Blockchain systems store sensitive business and consumer data. Regulations must ensure compliance with personal data protection laws (Yaumidin et al., 2025: 214). Privacy safeguards increase public trust. They also protect stakeholders from data misuse.

Ultimately, the effectiveness of blockchain depends on synergy among fatwas, regulations, and technology. Fatwas provide ethical and religious legitimacy. Regulations establish enforceability and institutional coordination (Wicaksono & Mahipal, 2025:



301). Blockchain delivers operational efficiency and transparency. Together, these elements form a strong halal governance framework. This integrated approach strengthens Indonesia's position in the global halal industry. A transparent and Sharia-compliant system increases international credibility. It also enhances competitiveness in halal export markets. Technology-driven halal assurance reflects modern Islamic economic values. Thus, blockchain supported by fatwas and regulation represents a sustainable future for the halal industry

## CONCLUSION

Transparency in the supply chain is a crucial element for building trust and integrity in the Indonesian halal industry. Blockchain technology offers a transformative technical solution to achieve this transparency and traceability. However, technology alone is not enough to ensure ease in buying and selling transactions. A strong foundation of Sharia law is needed to ensure its implementation is on-target, Sharia-compliant, and legally binding. Successful implementation depends heavily on support from Sharia law and regulations. A fatwa from the National Sharia Council (DSN-MUI) governing the legal status of smart contracts and the use of blockchain data is urgently needed to provide certainty and Sharia-compliant legitimacy for businesses, especially in the Indonesian halal industry. Furthermore, the government must immediately develop comprehensive regulations to recognize the legal validity of digital data, establish technical standards, and guarantee the privacy of sensitive business data. Only through synergy between Sharia fatwas, positive legal regulations, and advances in blockchain technology can Indonesia realize a truly transparent, accountable, and world-class halal industry ecosystem. This synergy will ensure that the blockchain technology revolution in Indonesia's halal industry not only increases efficiency but also substantially strengthens product halal assurance for the benefit of the community.

## REFERENCES

- Adam, P. (2022). *Fatwa-Fatwa Ekonomi Syariah: Konsep, Metodologi, dan Implementasinya pada Lembaga Keuangan Syariah*. AMZAH.
- Almunawar, M. N., Fauzi, A. M., Almunawar, Z. S., & Masri, M. (2025). Modelling business ecosystem of halal industry – case halal food industry in Indonesia. *Journal of Islamic Marketing*. <https://doi.org/10.1108/JIMA-06-2024-0221>
- Alourani, A., & Khan, S. (2025). Halal Food Traceability System using AI and Blockchain. *Journal of Posthumanism*, 5(2). <https://doi.org/10.63332/joph.v5i2.437>



- Apriani, D., Azizah, N. N., Ramadhona, N., & Kusumawardhani, S. A. R. (2023). Optimasi Transparansi Data dalam Rantai Pasokan melalui Integrasi Teknologi Blockchain. *Jurnal MENTARI: Manajemen Pendidikan Dan Teknologi Informasi*, 2(1), 1–10. <https://doi.org/10.34306/mentari.v2i1.326>
- Ardiantono, D. S., Ardyansyah, G. D., Sugihartanto, M. F., Al Mustofa, M. U., & Lisdiantini, N. (2024). Mapping the barrier and strategic solutions of halal supply chain implementation in small and medium enterprises. *Journal of Islamic Marketing*, 15(7), 1673–1705. <https://doi.org/10.1108/JIMA-08-2022-0229>
- Chatra, M. A., Syamil, A., Subawa, Budaya, I., Munizu, M., Darmayanti, N. L., ... Dulame, I. M. (2023). *Manajemen Rantai Pasok* (1st ed.). PT. Sonpedia Publishing Indonesia.
- Dermawan, M. J., Sudana, & Samudra, M. G. (2024). Halal Label and Purchase Decisions on Food and Beverage Products: A Case Study in Cipedes Subdistrict Bandung City. *Jurnal Penelitian Medan Agama*, 15(2), 130–146. <https://doi.org/10.58836/jpma.v15i2.22120>
- Effendi, K. A., Mukhlis, T. I., Padmanegara, O. H., & Widajatun, V. W. (2023). Analisis Transformasi Halal Awareness dan Teknologi Blockchain Terhadap Penguatan Halal Value Chain Di Indonesia. *Jurnal Ilmiah Ekonomi Islam*, 9(3), 3275. <https://doi.org/10.29040/jiei.v9i3.10383>
- Fernando, Y., & Hassan, I. S. (2025). When gorgeousness embraces technological ingenuity: future of blockchain-based halal beauty supply chain. *Journal of Islamic Marketing*. <https://doi.org/10.1108/jima-05-2024-0203>
- Nugroho, A. A., Sumiyati, S., & Hamsani, H. (2024). Integrity and Legitimacy of Halal Products: The Urgency of Halal Supply Chain Management Technology Adoption in Halal Product Authentication Traceability Evidence from Indonesia. *The South East Asian Journal of Management*, 18(1), 54–80. <https://doi.org/10.21002/seam.v18i1.1485>
- Nuruly, Y., Sembayeva, A., Aktymbayeva, A., Abdullayeva, A., & Moldagaliyeva, A. (2025). Blockchain-based loyalty programs in the hotel industry: a systematic review. *Journal of Hospitality and Tourism Technology*, 1–19. <https://doi.org/10.1108/JHTT-09-2024-0609>
- Qanita, A., Maghfuroh, L., & Muhammad, Z. (2024). Integration Of HAS With Blockchain As Halal Sustainability In Maqashid Sharia Perspective. *Journal of Halal Product and Research*, 7(1), 40–51. <https://doi.org/10.192501/jhpr.vol.7>
- Salehi, M., & Molavi, H. (2025). The relationship between the use of blockchain technology and the accountability and reporting. *Corporate Governance (Bingley)*. <https://doi.org/10.1108/CG-12-2024-0674>



- Sholihin, R. (2024). Konsep Halal dan Haram (Perspektif Hukum dan Pendidikan). *Journal of Islamic and Law Studies*, 8(1), 1–8. <https://doi.org/10.18592/jils.v8i1.12842>
- Usmi, V., Nagara, S. H., Majestica, A., Sukmawati, S., & Lestarika, D. P. (2024). Hak atas Informasi bagi Konsumen terhadap Labelisasi Halal dan Non Halal pada Industri Kuliner. *Indonesian Journal of Law and Justice*, 2(1), 9. <https://doi.org/10.47134/ijlj.v2i1.3173>
- Wahyudi, M. A., & Karim, B. (2022). Konsep Halal Ulama Madura: Perspektif Ulama Madura Terhadap Konsep Halal dalam Kandungan Syair Madura. *SIBATIK JOURNAL: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, Dan Pendidikan*, 1(12), 3007–3016. <https://doi.org/10.54443/sibatik.v1i12.530>
- Warto, & Samsuri. (2020). Sertifikasi Halal dan Implikasinya Bagi Bisnis Produk Halal di Indonesia. *Al Maal: Journal of Islamic Economics and Banking*, 2(1), 98–112. <https://doi.org/10.31000/almaal.v2i1.2803>
- Wicaksono, Y. P., & Mahipal. (2025). Eksistensi Hukum Islam dalam Sistem Hukum Nasional Indonesia: Peluang dan Tantangan. *IJJEL: Indonesian Journal of Islamic Jurisprudence, Economic and Legal Theory*, (3), 2138–2151. <https://doi.org/10.62976/ijjel.v3i3.1238>
- Yaumidin, U. K., Yuliana, C. I., Soesilowati, E. S., Hidayatina, A., Mulyaningsih, Y., Bakti, I. G. M. Y., ... Malik, F. (2025). The moderating effect of halal certification awareness on farmers' behaviour for halal rice: an extended theory of planned behaviour. *Journal of Islamic Marketing*, 16(6), 1720–1741. <https://doi.org/10.1108/JIMA-07-2024-0281>
- Yli-Huumo, J., Ko, D., Choi, S., Park, S., & Smolander, K. (2016). Where is current research on Blockchain technology? - A systematic review. *PLoS ONE*, 11(10). <https://doi.org/10.1371/journal.pone.0163477>
- Zhang, X. (2025). Design and implementation of a blockchain-enabled financial cost accounting framework for food supply and sourcing systems. *British Food Journal*, 1–15. <https://doi.org/10.1108/BFJ-04-2025-0537>

